Diabetes Mellitus, Deaths: Relation with Medical Radiation

Box 1 of Chap. 29
Summary: Regression Outputs, Deaths due to Diabetes Mellitus.

Below are the summary-results from all the regressions of MortRates upon PhysPops. MortRates come from Table 29-A, and PhysPops come from Table 3-A.

We think that the positive correlation, which grows between PhysPop (1921 to 1940) and 1940 MortRates for Diabetes Mellitus, is very probably a correlation between PhysPop and xray-induced deaths during 1940 from Ischemic Heart Disease (IHD) in people having diabetes. Chapters 40, 41 show the PhysPop-IHD correlations in 1950. In 1940, IHD was not reported as a distinct cause of death. Later, it was learned that many diabetics have elevated levels of atherogenic lipoproteins, and that their MortRate from IHD is high. Today, almost 75% of diabetics die from IHD (Bierman 1992, p.647). In 1949, the rules were altered for reporting the underlying cause of death in diabetics, and by 1950, IHD was reported as a distinct cause of death. In 1950, reported MortRates from Diabetes Mellitus fell to half of the 1940 values (Table 29-A), and the correlations with PhysPop (below) abruptly dropped to 0.11 and 0.20.
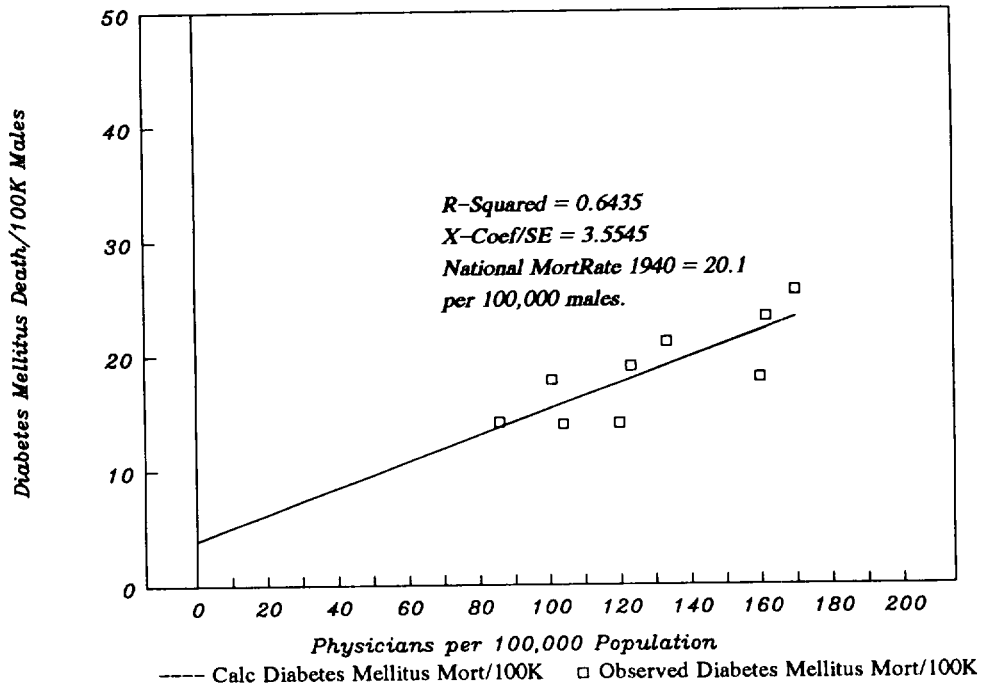
MALES ....

Year MortRate	Year PhysPop	R-squared	Constant	Coeff.	Std Err	Coeff/S.E
1940	1921	0.1046	6.742	0.0875	0.0968	0.9045
1940	1923	0.1653	5.095	0.1026	0.0871	1.1774
1940	1925	0.2190	4.645	0.1095	0.0781	1.4008
1940	1927	0.3362	2.323	0.1300	0.0690	1.8827
1940	1929	0.3694	2.230	0.1318	0.0651	2.0250
1940	1931	0.3853	3.265	0.1228	0.0586	2.0949
1940	1934	0.4969	3.181	0.1227	0.0467	2.6296
1940	1936	0.5458	2.967	0.1237	0.0426	2.9004
1940	1938	0.5999	3.119	0.1218	0.0376	3.2398
1940	1940	0.6435	3.930	0.1135	0.0319	3.5545
1950	1950	0.1127	7.966	0.0226	0.0239	0.9429
1960	1960	0.0257	10.427	0.0099	0.0230	0.4298
1970	1970	0.0131	10.046	0.0050	0.0163	0.3049
1980	1980	0.0076	9.359	0.0027	0.0115	0.2310
1990	1990	0.0396	13.971	-0.0070	0.0130	-0.5369

FEMALES ....

Year MortRate	Year PhysPop	R-squared	Constant	Coeff.	Std Err	Coeff/S.E
1940	1921	0.0648	7.831	0.1563	0.2243	0.6967
1940	1923	0.1205	2.859	0.1986	0.2028	0.9794
1940	1925	0.1458	3.184	0.2025	0.1853	1.0929
1940	1927	0.2556	-3.173	0.2569	0.1657	1.5502
1940	1929	0.2901	-3.885	0.2648	0.1566	1.6915
1940	1931	0.3088	-2.115	0.2492	0.1409	1.7684
1940	1934	0.4224	-3.217	0.2566	0.1134	2.2626
1940	1936	0.4875	-4.478	0.2650	0.1027	2.5802
1940	1938	0.5502	-4.597	0.2644	0.0903	2.9264
1940	1940	0.6005	-3.113	0.2486	0.0766	3.2441
1950	1950	0.2039	7.071	0.0681	0.0509	1.3390
1960	1960	0.0127	12.863	0.0115	0.0382	0.3001
1970	1970	0.0113	12.774	-0.0065	0.0231	-0.2824
1980	1980	0.1942	12.677	-0.0173	0.0133	-1.2987
1990	1990	0.3638	16.307	-0.0225	0.0113	-2.0008

1940 MortRate, Males, Diabetes Mellitus Deaths, versus
1940 PhysPop Values for the 9 Census Divisions, USA.
Significant DIRECT Relationship.
PhysPop is a surrogate for accumulated dose from medical irradiation.

R–Squared = 0.6435
X–Coef/SE = 3.5545
National MortRate 1940 = 20.1
per 100,000 males.

Physicians per 100,000 Population
---- Calc Diabetes Mellitus Mort/100K   □ Observed Diabetes Mellitus Mort/100K

1940 MortRate, Females, Diabetes Mellitus Deaths, versus
1940 PhysPop Values for the 9 Census Divisions, USA.
Significant DIRECT Relationship.
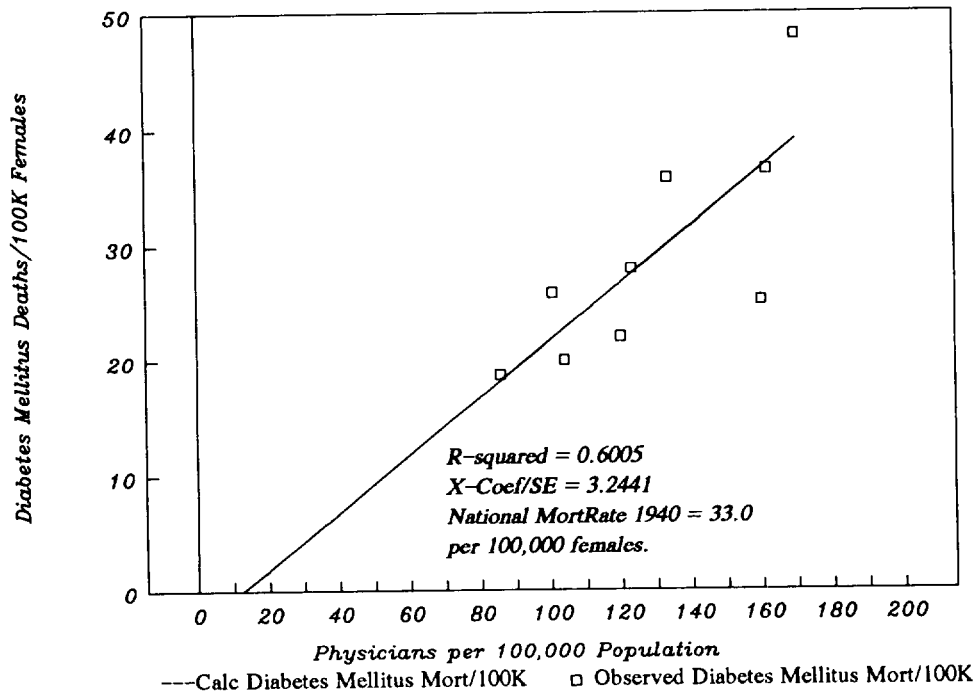PhysPop is a surrogate for accumulated dose from medical irradiation

R–squared = 0.6005
X–Coef/SE = 3.2441
National MortRate 1940 = 33.0
per 100,000 females.

Physicians per 100,000 Population
---Calc Diabetes Mellitus Mort/100K   □ Observed Diabetes Mellitus Mort/100K

Table 29-A

Diabetes Mellitus: Death Rates by Census Divisions and National

Abrupt drop, 1940 vs. 1950: The rules were altered in 1949 for reporting the underlying cause of death in diabetics (Chaper 4, Part 5).

Annual death-rates per 100,000 are age-adjusted to the 1940 reference year. There are no exclusions by color or "race." Entries for the Nine Census Divisions are population-weighted; the averages below them are not. "National Rates" for both sexes: Deaths per 100,000 population (males + females). Males: Deaths per 100,000 male population. Females: Deaths per 100,000 female population.

MALES

Census Division	1940	1950	1960	1970	1980	1990
Pacific	18.0	7.8	8.6	8.3	7.9	9.0
New England	23.3	12.6	13.2	11.7	10.2	12.6
West North Central	19.0	11.6	11.6	10.2	8.7	11.0
Mid-Atlantic	25.6	12.5	13.7	12.8	11.8	12.9
East North Central	21.1	13.7	13.7	12.6	11.4	14.2
Mountain	14.0	8.8	9.6	9.3	8.9	11.9
West South Central	13.9	9.9	11.8	11.0	10.1	15.0
East South Central	14.1	9.3	10.5	10.1	9.6	11.7
South Atlantic	17.8	10.9	12.2	11.2	10.2	12.7
Average ALL	18.5	10.8	11.7	10.8	9.9	12.3
Average High-Five	21.4	11.6	12.2	11.1	10.0	11.9
Average Low-Four	15.0	9.7	11.0	10.4	9.7	12.8
Ratio (High/Low)	1.43	1.20	1.10	1.07	1.03	0.93

FEMALES

	1940	1950	1960	1970	1980	1990
Pacific	25.1	9.1	9.8	8.4	7.0	11.0
New England	36.5	19.3	15.3	11.7	8.0	9.4
West North Central	27.9	16.3	13.3	10.4	7.5	9.9
Mid-Atlantic	48.1	21.6	18.2	14.5	10.8	11.0
East North Central	35.8	21.3	18.8	15.0	11.1	12.4
Mountain	22.0	12.1	11.1	9.9	8.6	10.5
West South Central	20.0	13.3	15.1	12.9	10.6	14.4
East South Central	18.7	11.7	12.8	11.9	10.9	12.2
South Atlantic	25.8	15.7	14.2	12.1	9.9	11.5
Average ALL	28.9	15.6	14.3	11.8	9.4	11.4
Average High-Five	34.7	17.5	15.1	12.0	8.9	10.7
Average Low-Four	21.6	13.2	13.3	11.7	10.0	12.2
Ratio (High/Low)	1.60	1.33	1.13	1.03	0.89	0.88

NATIONAL RATES

	1940	1950	1960	1970	1980	1990
Both Sexes	26.6	14.5	13.9	11.9	9.9	11.8
Males	20.1	11.5	12.2	11.2	10.1	12.4
Females	33.0	17.3	15.4	12.6	9.7	11.1

● - 1940,1950, 1960; All rates come from Grove 1968, Table 67, Pages 706-709, "Diabetes Mellitus (260)" ICD/7.
  ● - 1970 rates are interpolations (Chap. 4, Parts 2b, 2c).
  ● - 1980: All rates (ICD/9, Diabetes Mellitus (250)) come from reference NatCtrHS 1980.
  ● - 1990: Rates are for 1989-91, from Monthly Vital Statistics Report, Vol.43, No.4, October 4, 1994. "Both sexes" combined is approximated as the average of male and female values. Details in Chap. 4, Part 2b.